

Appendix G7
Sierra Research CEQA Air Quality Assessment

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California Environmental Quality Act Air Quality Impact Assessment of the BHP Cabrillo Deepwater Port LNG Import Terminal

prepared for:

BHP Billiton

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SUMMARY

BHP Billiton (BHP), EPA Region IX (EPA), and the California State Lands Commission (State Lands) are currently assessing the impacts of the proposed Cabrillo Port Offshore LNG Import Terminal (Cabrillo Port). An ambient air impacts analysis was prepared as part of the December 30, 2003 PSD permit application. Since that time, however, BHP has further refined the project design and emissions estimates.¹ In addition, EPA and other reviewers have requested additional refinements to the analysis. The following modeling analysis was prepared to update the ambient air impacts analysis to reflect the new emission rates and discussions with reviewers.

The modeling analysis is based on predicted maximum Cabrillo Port emissions. NO_x, SO₂, CO, and PM₁₀/PM_{2.5} emissions from the stationary source (including the support vessels and LNG carriers in District and Federal waters) were modeled using the EPA-approved Offshore and Coastal Dispersion (OCD) Model. The overwater receptor grid extended approximately 22 miles up and down the coast from the FSRU. The overland receptor grid extended two miles inland from the shoreline between Oxnard and Point Dume, and receptors were also placed at 100 meter intervals along the shoreline from Point Dume to the Palos Verdes Peninsula in the South Coast Air Basin (SoCAB). Worst case impacts were determined at both onshore and offshore receptors. Ambient impacts at the worst case onshore receptor for each pollutant were well below the federal significance thresholds. For example, NO₂ and PM₁₀ levels at the worst case onshore receptor are expected to be only five percent of the applicable significance thresholds. Based upon this modeling, Cabrillo Port will not materially impact onshore air quality and will not cause or contribute to onshore ambient air quality standard violations.

1.0 AIR QUALITY IMPACT ANALYSIS

1.1 AIR QUALITY MODELING METHODOLOGY

As for the original air quality impact analysis performed for the project in the PSD permit application, this update to the air quality impact analysis used the OCD Model. The offshore meteorological data set used by the model was expanded and updated from the three-year data set previously used² and consists of data collected during 2000--2004 by the National Oceanic and Atmospheric Administration (NOAA) at Buoy Station 46025 – Santa Monica Basin. Mixing heights were set to 500 meters and relative humidity was set to 80%. The ambient air impacts analysis has been further revised to include potential effects of platform downwash using the same FSRU dimensions that were used for the screening analysis for ammonia impacts. The OCD model was recompiled to allow the use of up to 50,000 receptors per run. No other changes to the model or meteorological data were made.

¹ Revised emissions estimates are being submitted under separate cover.

² NOAA Buoy Station 46025, 1991-1993.

1.2 PROJECT EMISSIONS

Initial estimates of the Project's emissions were included in the December 2003 PSD application. Updated estimates provided in August 2004 formed the basis for the October 2004 EIR prepared by State Lands. Since that time, BHP has revised downward the estimated emissions attributable to certain of the sources as the result of utilization of equipment that will meet the Tier 2 non-road Diesel emission standards. In addition, the Project emissions estimates were revised to include LNG-fueled support vessel operations in District and federal waters. The revised emission rates were used in this air quality impact analysis. Table 1-1 below summarizes the revised emissions from the sources located on the FSRU and from vessel operations in District and federal waters.

**Table 1-1
Cabrillo Port Operational Emissions Summary**

Description	Emissions, tons per year				
	NOx	ROC	CO	SO ₂	PM ₁₀ /PM _{2.5} ^a
Stationary Source (FSRU)					
Wartsila 9L50DF Main Generators	13.3	20.6	18.0	0.07	7.7
Wartsila 9L50DF Backup Generator	1.9	0.3	0.2	<0.1	0.1
Submerged Combustion Vaporizers	48.9	3.5	148.9	0.33	3.8
Emergency Fire Pump and Generator	3.0	0.4	1.9	<0.1	0.1
Freefall Lifeboat	<0.1	<0.1	<0.1	<0.1	<0.1
Diesel Fuel Storage Tank	-0-	<0.1	-0-	-0-	-0-
Total Stationary Source	67.2	24.8	169.0	0.41	11.8
Marine Vessels, District Waters^b					
Tug Supply Boats	0.7	0.1	0.5	<0.1	<0.1
Crew Boat	0.4	<0.1	0.3	<0.1	<0.1
Subtotal, District Waters	1.2	0.2	0.8	<0.1	<0.1
Marine Vessels, Federal Waters^c					
Tug Supply Boats	91.7	12.8	60.3	<0.1	1.2
Crew Boat	2.1	0.3	1.4	<0.1	<0.1
LNG Carrier	69.2	9.6	45.5	<0.1	0.9
Subtotal, Federal Waters	163.0	22.7	107.2	<0.1	2.1

Notes:

a. All PM₁₀ assumed to be PM_{2.5}.

b. District waters extend approximately 3.5 miles from shoreline.

c. Federal waters extend from the District water boundary to approximately 25 miles from shoreline.

The activity data on which these emissions calculations are based are being provided to the agencies by the applicant under separate cover. These activity data were also the basis for calculation of emissions over shorter periods to allow comparison of modeled impacts with short-term ambient air quality standards. The emission rates used in the modeling analysis are shown in the appendix.

1.3 AIR QUALITY IMPACT ANALYSIS

1.3.1 Receptor Locations

The overwater receptor grid extended approximately 22 miles up and down the coast from the FSRU. The overland receptor grid extended two miles inland from the shoreline with additional receptors in the Oxnard area. Additional receptors were placed along the shoreline of the South Coast Air Basin from Point Dume to the Palos Verdes peninsula.

Receptors have been excluded from a 500-meter exclusion zone surrounding the FSRU. Under federal law (33 CFR 165.2 Subpart C, Safety Zones), a safety zone is an area “to which for safety or environmental purposes, access is limited to authorized persons, vehicles, or vessels. It may be stationary and described by fixed limits or it may be described as a zone around a vessel in motion.” The Applicant has requested from the U.S. Coast Guard a safety zone with a radius of 500 meters from the outer edge of the FSRU. If the project is approved, the safety zone will be added to navigation charts as a limited access area only, established in accordance with 33 CFR Part 150. Only LNG carriers bound for the FSRU and service and supply vessels associated with the FSRU and LNG carrier operations would be allowed to enter the safety zone. By federal law, the general public would no longer have access to this area. The safety zone would be rigorously patrolled to prevent the incursion of unauthorized personnel.

This exclusion is consistent with the December 19, 1980 letter from Douglas Costle to Senator Jennings Randolph stating that an “exemption from ambient air is available only for the atmosphere over land owned or controlled by the source and to which public access is precluded by a fence or other physical barriers.” This exemption was further clarified in an April 30, 1987 letter from G.T. Helms of OAQPS to Steve Rothblatt, Chief of the Region V Air Division, stating that receptors must be placed in a river that is a public waterway because it is not controlled by the source. However, the letter also lays out the conditions under which the adjacent riverbank may be excluded from ambient air: “[t]he riverbank must be clearly posted and regularly patrolled by plant security. It must be very clear that the area is not public.” Because the safety zone is an area that will be controlled by the source, clearly posted on navigational charts, and rigorously patrolled, the general public will not have access to the area and the safety zone is not considered to be ambient air. This approach is consistent with the way in which EPA Region 6 handled the safety zone for the El Paso Energy Bridge (now, Gulf Gateway Energy Bridge). In that situation, EPA recognized that the general public is excluded from the safety zone and so the area within the safety zone does not meet the definition of “ambient air.”

1.3.2 Results of the Air Quality Impact Analysis

Results of the air quality modeling analysis are summarized in Tables 1-2 through 1-5. Tables 1-2 and 1-3 compare the maximum modeled concentrations from project emissions to the PSD significance thresholds and Class II increments. Stationary source impacts and stationary source plus marine vessel impacts are shown separately. Tables 1-2 and 1-3 show that the maximum project impacts for all pollutants and averaging periods occur at sea. Tables 1-2 and 1-3 also show that with the exception of annual average impacts, maximum modeled impacts of the project in the South Coast Air Basin are less than half of the maximum modeled onshore impacts. With the exception of annual average NO₂, all project impacts are well below all significance thresholds. The area in which the modeled annual average NO₂ concentrations exceed the significant impact level extends less than 5000 meters to the east of the Coast Guard exclusion zone, immediately adjacent to the FSRU and located over 10 miles from any onshore receptors. Modeled impacts for all pollutants and averaging periods are much lower onshore.

Eight-hour average NO₂ concentrations are presented in lieu of ozone modeling; this issue is discussed in greater detail below.

Tables 1-4 and 1-5 show, for stationary sources and all sources, respectively, the maximum modeled onshore impacts from the project combined with representative background pollutant concentrations, and compare these total projected impacts with the state and federal ambient air quality standards. These results show that emissions from the proposed FSRU would not cause or contribute to any violations of any state or federal ambient air quality standard. EPA has stated that it is its longstanding policy to use significant impact levels to determine whether a proposed new or modified source will cause or contribute significantly to a violation of the national ambient air quality standards (NAAQS) or PSD increments. If a source's maximum impacts are below the significant impact levels, then the source is judged to not cause or contribute significantly to a NAAQS or increment violation. As the Project's onshore impacts are well below the significant impact levels for each pollutant, the Project will not cause or contribute to a NAAQS or increment violation.

The District consists of both attainment and nonattainment areas. Anacapa Island and San Nicolas Island are within the District boundaries and are designated as attainment for all federal standards. The portion of the County on the mainland is designated as a nonattainment area for ozone and as an attainment area for all other federal standards. The Project is essentially the same distance from Anacapa Island as the mainland. In Figures 1-9 through 1-12 it can be seen that the impacts to Anacapa Island from the combined FSRU source and marine vessel emissions are less than or equal to the impacts on the mainland for all pollutants. Therefore, this report focuses on impacts to the mainland.

Table 1-2
Comparison of Maximum Modeled Stationary Source Impacts with PSD Significance
Thresholds and Class II Increments

Pollutant	Avg Period	Max. Modeled Offshore Impact ($\mu\text{g}/\text{m}^3$)	Max. Modeled Onshore Impact ($\mu\text{g}/\text{m}^3$)	Max. Modeled Impact in SoCAB ($\mu\text{g}/\text{m}^3$) ^a	PSD Significance Threshold ($\mu\text{g}/\text{m}^3$)	PSD Class II Increment ($\mu\text{g}/\text{m}^3$)
NO ₂ ^b	1-hour	173.1	31.8	9.2	--	--
	8-hour ^c	23.9	1.5	0.6	--	--
	annual	2.1	0.02	0.02	1.0	25
SO ₂	1-hour	0.3	0.08	0.01	--	--
	3-hour	0.2	0.02	0.02	25	325
	24-hour	0.1	<0.01	<0.01	5	91
	annual	0.01	<0.01	<0.01	1.0	20
CO	1-hour	155.1	37.1	10.4	2,000	--
	8-hour	64.8	3.6	1.3	500	--
PM ₁₀ /PM _{2.5}	24-hour	0.8	0.1	0.03	5	30
	annual	0.2	<0.01	<0.01	1.0	17

Note: a. See Figure 1-17 for locations of SoCAB receptors.

b. To be conservative, all NO_x is assumed to be NO₂ in evaluating ambient impacts.

c. 8-hr average NO₂ concentration is modeled for use in estimating project ozone impacts.

Table 1-3
Comparison of Maximum Modeled Project Impacts with PSD Significance Thresholds and
Class II Increments (Stationary Sources and Marine Vessels, Including LNG Carriers)

Pollutant	Avg Period	Max. Modeled Offshore Impact ($\mu\text{g}/\text{m}^3$)	Max. Modeled Onshore Impact ($\mu\text{g}/\text{m}^3$)	Max. Modeled Impact in SoCAB ($\mu\text{g}/\text{m}^3$)	PSD Significance Threshold ($\mu\text{g}/\text{m}^3$)	PSD Class II Increment ($\mu\text{g}/\text{m}^3$)
NO ₂ ^a	1-hour	273.8	46.3	15.3	--	--
	8-hour ^b	65.0	5.2	1.8	--	--
	annual	4.1	0.05	0.05	1.0	25
SO ₂	1-hour	0.3	0.08	0.01	--	--
	3-hour	0.2	0.02	0.02	25	325
	24-hour	0.1	<0.01	<0.01	5	91
	annual	0.01	<0.01	<0.01	1.0	20
CO	1-hour	181.3	42.7	14.5	2,000	--
	8-hour	76.6	5.2	2.0	500	--
PM ₁₀ /PM _{2.5}	24-hour	0.9	0.1	0.04	5	30
	annual	0.2	<0.01	<0.01	1.0	17

Note: a. To be conservative, all NO_x is assumed to be NO₂ in evaluating ambient impacts.

b. 8-hr average NO₂ concentration is modeled for use in estimating project ozone impacts.

Table 1-4
Comparison of Maximum Modeled Onshore Stationary Source Impacts with Ambient Air Quality Standards

Pollutant	Avg Period	Max. Modeled Onshore Impact ($\mu\text{g}/\text{m}^3$)	Background Conc. ($\mu\text{g}/\text{m}^3$)^a	Total Impact ($\mu\text{g}/\text{m}^3$)	State Standard ($\mu\text{g}/\text{m}^3$)	Federal Standard ($\mu\text{g}/\text{m}^3$)
NO ₂	1-hour	31.8	90.2	122.0	470	--
	annual	0.02	26	26	--	100
SO ₂	1-hour	0.08	18.3	18.4	655	--
	3-hour	0.02	39	39	--	1,300
	24-hour	<0.01	31	31	105	365
	annual	<0.01	10	10	--	80
CO	1-hour	37.1	8,469	8,506	23,000	40,000
	8-hour	3.6	4,921	4,925	10,000	10,000
PM ₁₀	24-hour	0.1	124	124	50	150
	annual	<0.01	29	29	20	50
PM _{2.5}	24-hour	0.1	32 ^b	32	--	65
	annual	<0.01	13	13	12	15

Note: ^a Background values for NO₂, SO₂, PM₁₀, and PM_{2.5} from El Rio monitoring station for 2002 (Station ID No. 061113001). Background values for CO from Ventura-Emma Wood State Beach monitoring station (Station ID No. 061112003).

^b Background values for PM_{2.5} based on 98th percentile.

Table 1-5
Comparison of Maximum Modeled Project Onshore Impacts with Ambient Air Quality Standards
(Stationary Sources and Marine Vessels, including LNG Carriers)

Pollutant	Avg Period	Max. Modeled Onshore Impact ($\mu\text{g}/\text{m}^3$)	Background Conc. ($\mu\text{g}/\text{m}^3$) ^a	Total Impact ($\mu\text{g}/\text{m}^3$)	State Standard ($\mu\text{g}/\text{m}^3$)	Federal Standard ($\mu\text{g}/\text{m}^3$)
NO ₂	1-hour	46.3	90.2	136.5	470	--
	annual	0.05	26	26	--	100
SO ₂	1-hour	0.08	18.3	18.4	655	--
	3-hour	0.02	39	39	--	1,300
	24-hour	<0.01	31	31	105	365
	annual	<0.01	10	10	--	80
CO	1-hour	42.7	8,469	8,512	23,000	40,000
	8-hour	5.2	4,921	4,926	10,000	10,000
PM ₁₀	24-hour	0.1	124	124	50	150
	annual	<0.01	29	29	20	50
PM _{2.5}	24-hour	0.1	32 ^b	32	--	65
	annual	<0.01	13	13	12	15

Note: ^a Background values for NO₂, SO₂, PM₁₀, and PM_{2.5} from El Rio monitoring station for 2002 (Station ID No. 061113001). Background values for CO from Ventura-Emma Wood State Beach monitoring station (Station ID No. 061112003).

^b 24-hour average background value for PM_{2.5} based on 98th percentile.

Tables 1-2 and 1-3 show that the maximum project impacts for all pollutants and averaging periods occur at sea. Modeled impacts for all pollutants and averaging periods are much lower onshore. Figures 1-1 through 1-4 and 1-9 through 1-12 show the modeled impacts of one-hour and annual NO₂ and 24-hour and annual PM₁₀/PM_{2.5} from the stationary sources on the FSRU alone and from the FSRU sources and the associated marine vessel activity in the vicinity of the project, respectively. Figures 1-5 through 1-8 and 1-13 through 1-16, respectively, show the onshore impacts in the Oxnard area for NO₂ and PM₁₀/PM_{2.5} for the FSRU sources alone and in combination with the marine vessels in greater detail. Figure 1-17 shows the locations of the receptors used to evaluate impacts of the project in the South Coast Air Basin.

Figures 1-18 through 1-25 show the modeled impacts of one-hour and annual NO₂ and 24-hour and annual PM₁₀/PM_{2.5} from the stationary sources on the FSRU alone and from the FSRU sources and the associated marine vessel activity along the coastline of the South Coast Air Basin and compare these modeled impacts to the California and national ambient air quality standards.

2.0 ASSESSMENT OF SIGNIFICANCE

2.1 SIGNIFICANCE COMPARISON TABLES

In the following tables, the maximum onshore ambient air quality impacts of the Cabrillo Port LNG facility are compared with the relevant federal concentration-based significance criteria for each pollutant.

2.1.1 Nitrogen Dioxide

Table 2.1 compares the onshore NO₂ impacts from the proposed Project with the ambient air quality standards and the Class I and Class II significant impact levels for NO₂. EPA specifies that a major source will not be considered to cause or contribute to a violation of a national ambient air quality standard if the ambient impacts attributable to that major source are less than or equal to the Class II significance levels at any locality that does not or would not meet the applicable national standard. 40 CFR § 51.165(b)(2). Ventura County, in its entirety, is an attainment area for the federal NO₂ standard. Impacts below the significant impact levels demonstrate that the Project will have inconsequential impacts to onshore air quality.

Comparison of the modeling results at the worst case receptors to the significant impact levels indicates that the Project will not have a material effect upon air quality. None of the onshore impact levels exceed the Class II NO₂ significance level of 1.0 µg/m³; maximum predicted impacts are more than an order of magnitude below the significance threshold. Therefore, the facility is not expected to cause or contribute to an on-shore violation of the NO₂ ambient air quality standard.

Table 2-1
Assessment of Significance for Onshore Impacts of Oxides of Nitrogen

Measure of Significance	Level	Concentration, µg/m ³	
		Stationary Sources	Stationary Sources and Marine Vessels
National AAQS	100 µg/m ³	0.02	0.05
Class II SIL	1.0 µg/m ³	0.02	0.05
Class II increment	25 µg/m ³	0.02	0.05
Class I SIL	0.1 µg/m ³	0.02	0.05
Class I increment	2.5 µg/m ³	0.02	0.05

2.1.2 Ozone

There are no approved air quality models for evaluating the ozone impacts of an individual project. However, the OCD modeling results and the unique attributes

of the proposed Project demonstrate that there is insignificant potential for the proposed Project to impact the onshore ozone nonattainment area.

The proposed Project's onshore NO₂ impacts are too small to materially contribute to ozone formation. The proposed Project's annual NO₂ impacts are only 5% of the Class II significant impact level. The proposed Project's short-term worst-case onshore NO₂ impact would be approximately 5.2 µg/m³ (8-hour average).

Based upon the minimal NO₂ impacts that will be experienced at the shoreline, the proposed Project is not expected to cause or materially contribute to any onshore violation of the ozone standard.

2.1.2 Carbon Monoxide

Table 2-2 compares the CO emission impacts from the proposed project with the ambient air quality standards and the Class II significant impact levels. EPA specifies that a major source will be considered to cause or contribute to a violation of a national ambient air quality standard if the ambient impacts attributable to that major source exceed the Class II significance levels at any locality that does not or would not meet the applicable national standard. 40 CFR § 51.165(b)(2). Ventura County, in its entirety, is an attainment area for the federal CO standards. Impacts below the significant impact levels demonstrate that the Project will have inconsequential impacts to onshore air quality.

A comparison of the modeling results at the worst-case receptors to the significant impact levels indicates that the Project will not have a material effect upon air quality. None of the impact levels exceed the CO significance levels of 500 µg/m³ (8-hour average) or 2,000 µg/m³ (1-hour average). Therefore, the facility is not expected to cause or contribute to any on-shore violation of the CO ambient air quality standard.

Table 2-2
Assessment of Significance for Onshore Impacts of Carbon Monoxide

Measure of Significance	Level	Concentration, µg/m ³	
		Stationary Sources	Stationary Sources and Marine Vessels
National AAQS – 1 hr	40,000 µg/m ³	37.1	42.7
National AAQS – 8 hr	10,000 µg/m ³	3.6	5.2
Class II SIL – 1 hr	2,000 µg/m ³	37.1	42.7
Class II SIL – 8 hr	500 µg/m ³	3.6	5.2

2.1.3 Sulfur Dioxide

Table 2-3 compares the modeled SO₂ emission impacts from the proposed Project to the ambient air quality standards and the Class I and Class II significant impact levels. EPA specifies that a major source will be considered to cause or contribute to a violation of a national ambient air quality standard if the ambient impacts attributable to that major source exceed the Class II significance levels at any locality that does not or would not meet the applicable national standard. 40 CFR § 51.165(b)(2). Ventura County, in its entirety, is an attainment area for the federal SO₂ standards. Impacts below the significant impact levels demonstrate that the Project will have inconsequential impacts to onshore air quality.

A comparison of the modeling results at the worst-case receptors to the significant impact levels indicates that the Project will not have a material effect upon air quality. None of the impact levels exceed the Class II SO₂ significance levels of 1 µg/m³ (annual average), 5 µg/m³ (24-hour average) or 25 µg/m³ (3-hour average). Therefore, the facility is not expected to cause or contribute to any on-shore violation of the SO₂ ambient air quality standard.

Table 2-3
Assessment of Significance for Onshore Impacts of Sulfur Dioxide

Measure of Significance	Level	Concentration, µg/m ³	
		Stationary Sources	Stationary Sources and Marine Vessels
National AAQS – 3 hr	1300 µg/m ³	0.02	0.02
National AAQS – 24 hr	365 µg/m ³	<0.01	<0.01
National AAQS – annual	80 µg/m ³	<0.01	<0.01
Class II SIL – 3 hr	25 µg/m ³	0.02	0.02
Class II SIL - 24 hr	5 µg/m ³	<0.01	<0.01
Class II SIL – annual	1.0 µg/m ³	<0.01	<0.01
Class I SIL - 3 hr	1.0 µg/m ³	0.02	0.02
Class I SIL - 24 hr	0.2 µg/m ³	<0.01	<0.01
Class I SIL – annual	0.1 µg/m ³	<0.01	<0.01

2.1.4 Fine Particulates

Table 2-4 compares the ambient PM₁₀ emission impacts from the proposed Project to the ambient air quality standards and the Class I and Class II significant impact levels. EPA specifies that a major source will be considered to cause or contribute to a violation of a national ambient air quality standard if the ambient impacts attributable to that major source exceed the Class II significance

levels at any locality that does not or would not meet the applicable national standard. 40 CFR § 51.165(b)(2). Ventura County, in its entirety, is an attainment area for the federal PM₁₀ and PM_{2.5} standards. Impacts below the significant impact levels demonstrate that the Project will have inconsequential impacts to onshore air quality.

A comparison of the modeling results at the worst-case receptors to the significant impact levels indicates that the Project will not have a material effect upon air quality. None of the impact levels exceed the Class II PM₁₀ significance levels of 1 µg/m³ (annual average) or 5 µg/m³ (24-hour average). While significance levels have yet to be developed for PM_{2.5}, the combination of onshore attainment status and the extremely low ambient impacts indicate that the proposed Project will have an insignificant effect upon air quality. Therefore, the facility is not expected to cause or contribute to any on-shore violation of the PM₁₀ or PM_{2.5} ambient air quality standards.

Table 2-4
Assessment of Significance for Onshore Impacts of Fine Particulates (PM₁₀)

Measure of Significance	Level	Concentration, µg/m ³	
		Stationary Sources	Stationary Sources and Marine Vessels
National AAQS - 24 hr	150 µg/m ³	0.1	0.1
National AAQS – annual	50 µg/m ³	<0.01	<0.01
Class II SIL -24 hr	5 µg/m ³	0.1	0.1
Class II SIL – annual	1 µg/m ³	<0.01	<0.01
Class I SIL - 24 hr	0.3 µg/m ³	0.1	0.1
Class I SIL – annual	0.2 µg/m ³	<0.01	<0.01

Table 2-5
Assessment of Significance for Onshore Impacts of Fine Particulates (PM_{2.5})

Measure of Significance	Level	Concentration, µg/m ³	
		Stationary Sources	Stationary Sources and Marine Vessels
National AAQS - 24 hr	65 µg/m ³	0.1	0.1
National AAQS – annual	15 µg/m ³	<0.01	<0.01

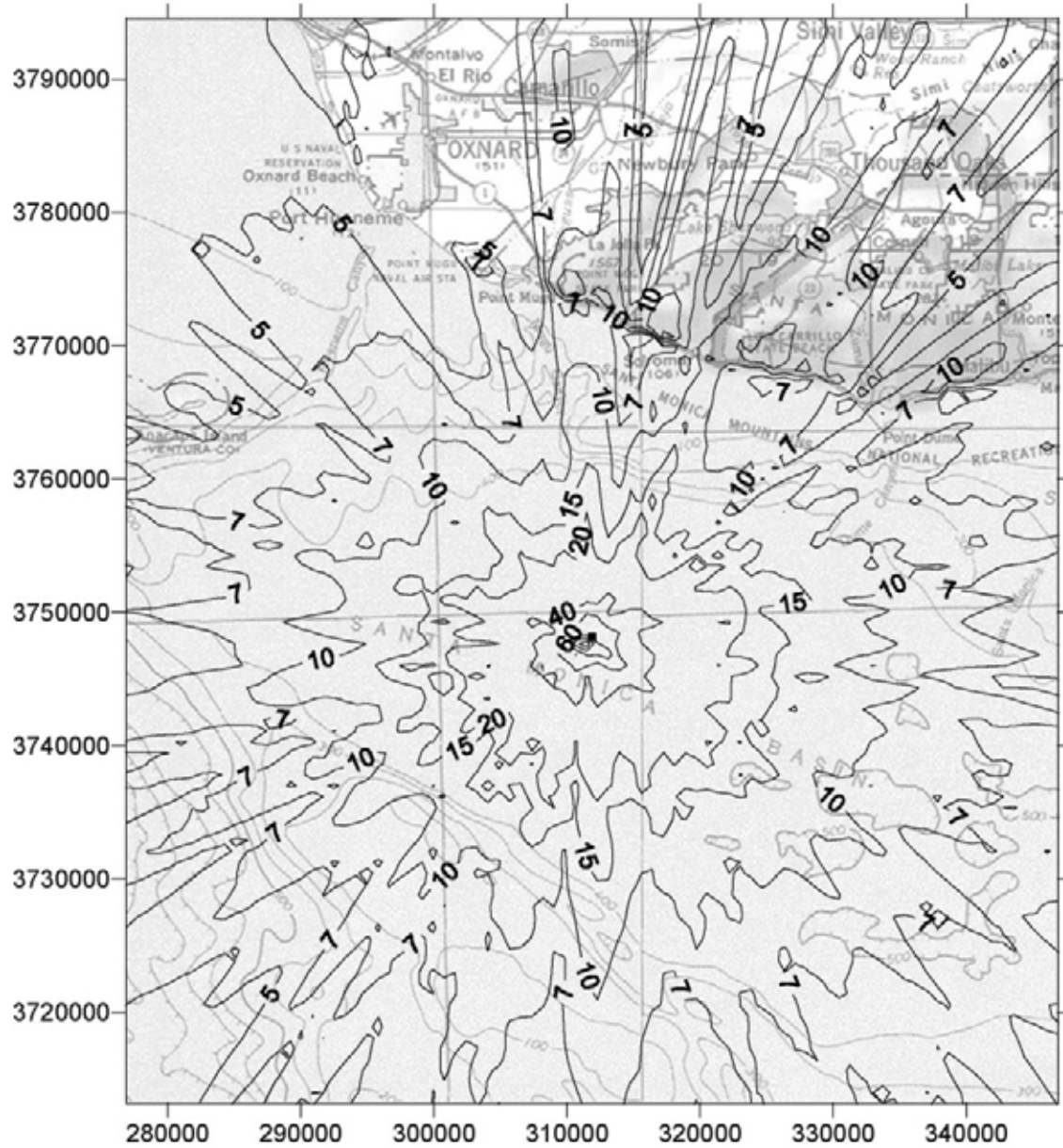
2.2 AMBIENT AIR QUALITY IMPACTS

As shown in the modeling results presented in Section 1, the maximum ambient impacts attributable to the proposed Project for all pollutants and averaging periods except annual NO₂ are expected to be less than the significant impact levels at the worst-case receptors. Impacts will be lower still onshore. As a result, the operation of the proposed Project will not cause or contribute to exceedances of the NAAQS for any pollutant. Accordingly, the Cabrillo LNG facility will not have a material impact on onshore ambient air quality.

2.3 OVERALL ASSESSMENT OF SIGNIFICANCE

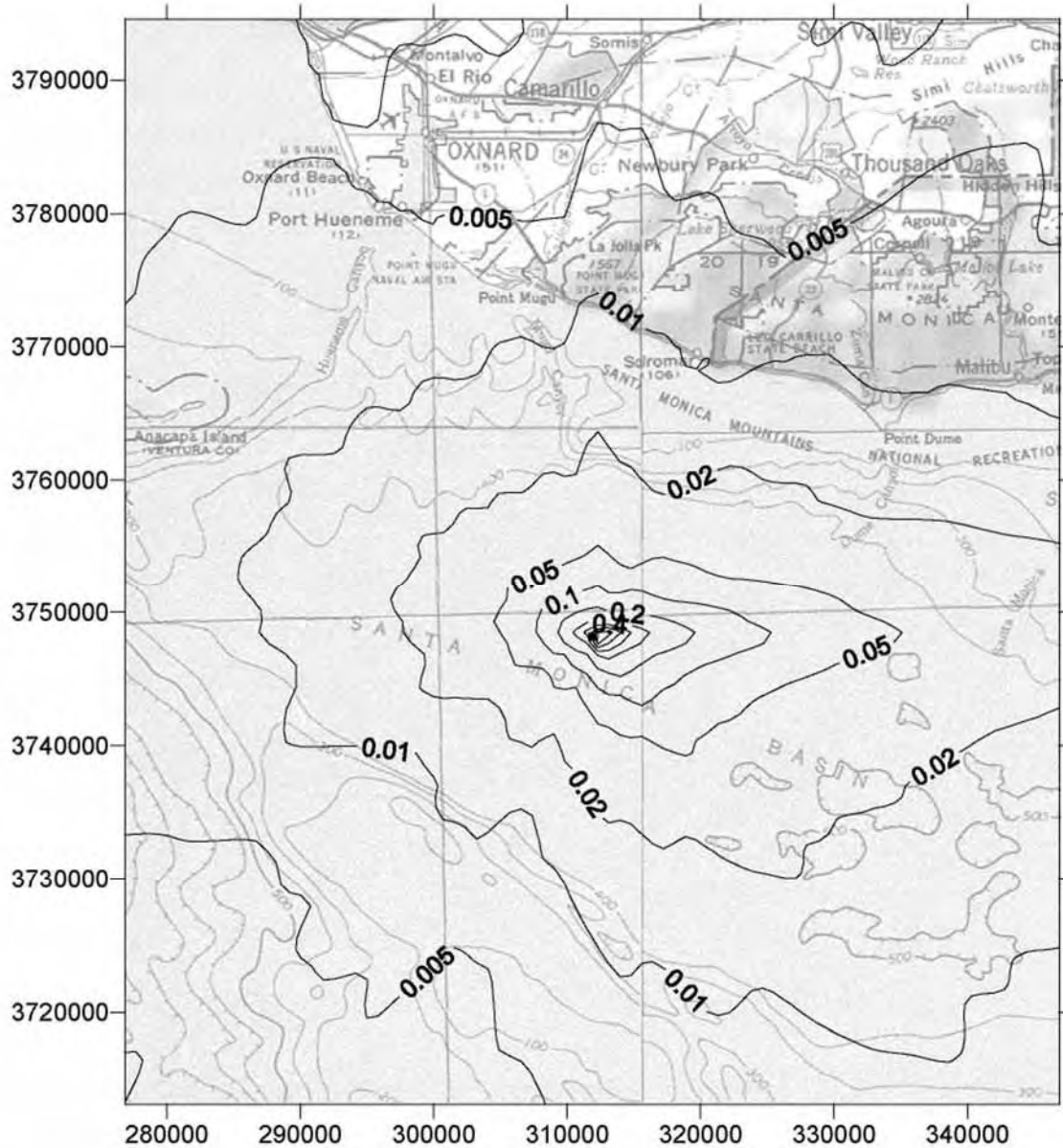
The analysis of impacts on air quality offshore within 22 miles of the facility and onshore between Oxnard to the north and the Palos Verdes Peninsula to the south shows that the operation of the LNG terminal facility will not cause or contribute to violations of the NAAQS. Further, the onshore impacts are not considered to be significant when compared with relevant measures of significance.

Figure 1-1
BHP Cabrillo LNG Deepwater Port
One-Hour Average NO₂ Impacts: FSRU Sources Only
Maximum Modeled Impacts



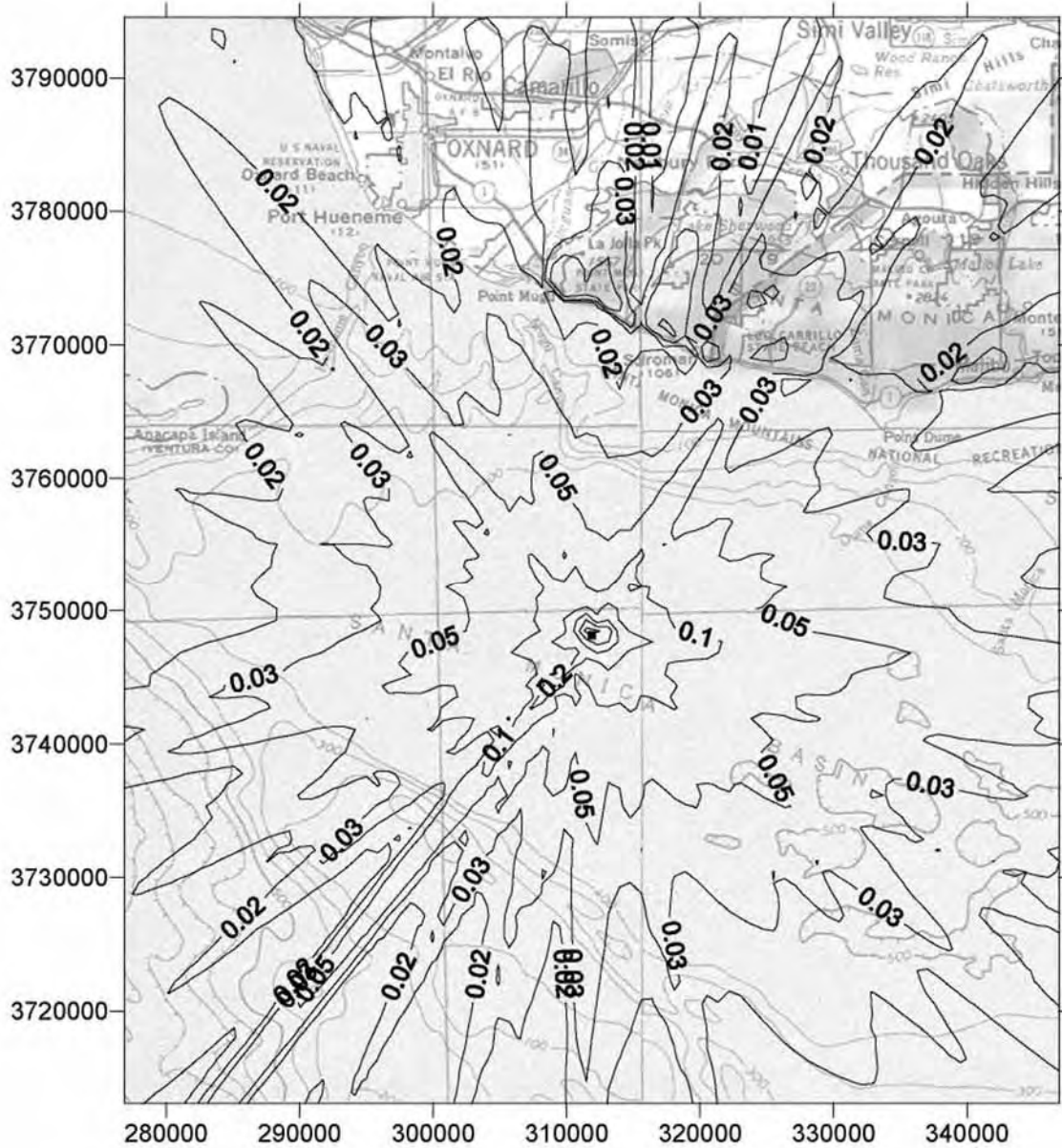
Note: Lines show contours of constant concentration; impacts are in units of µg/m³.

Figure 1-2
BHP Cabrillo LNG Deepwater Port
Annual Average NO₂ Impacts: FSRU Sources Only
Maximum Modeled Impacts



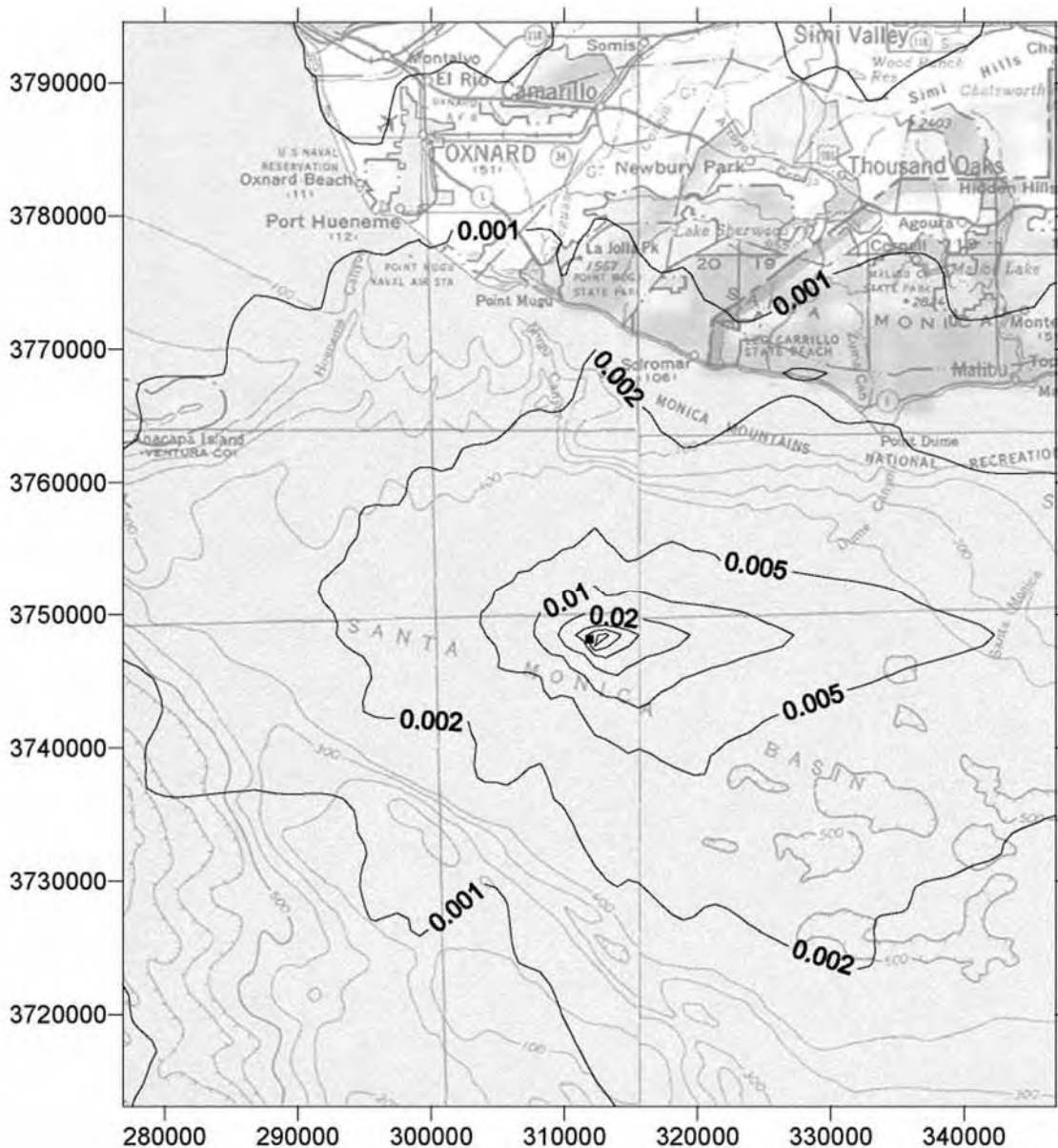
Note: Lines show contours of constant concentration; impacts are in units of $\mu\text{g}/\text{m}^3$.

Figure 1-3
BHP Cabrillo LNG Deepwater Port
24-hr Average PM₁₀ Impacts: FSRU Sources Only
Maximum Modeled Impacts



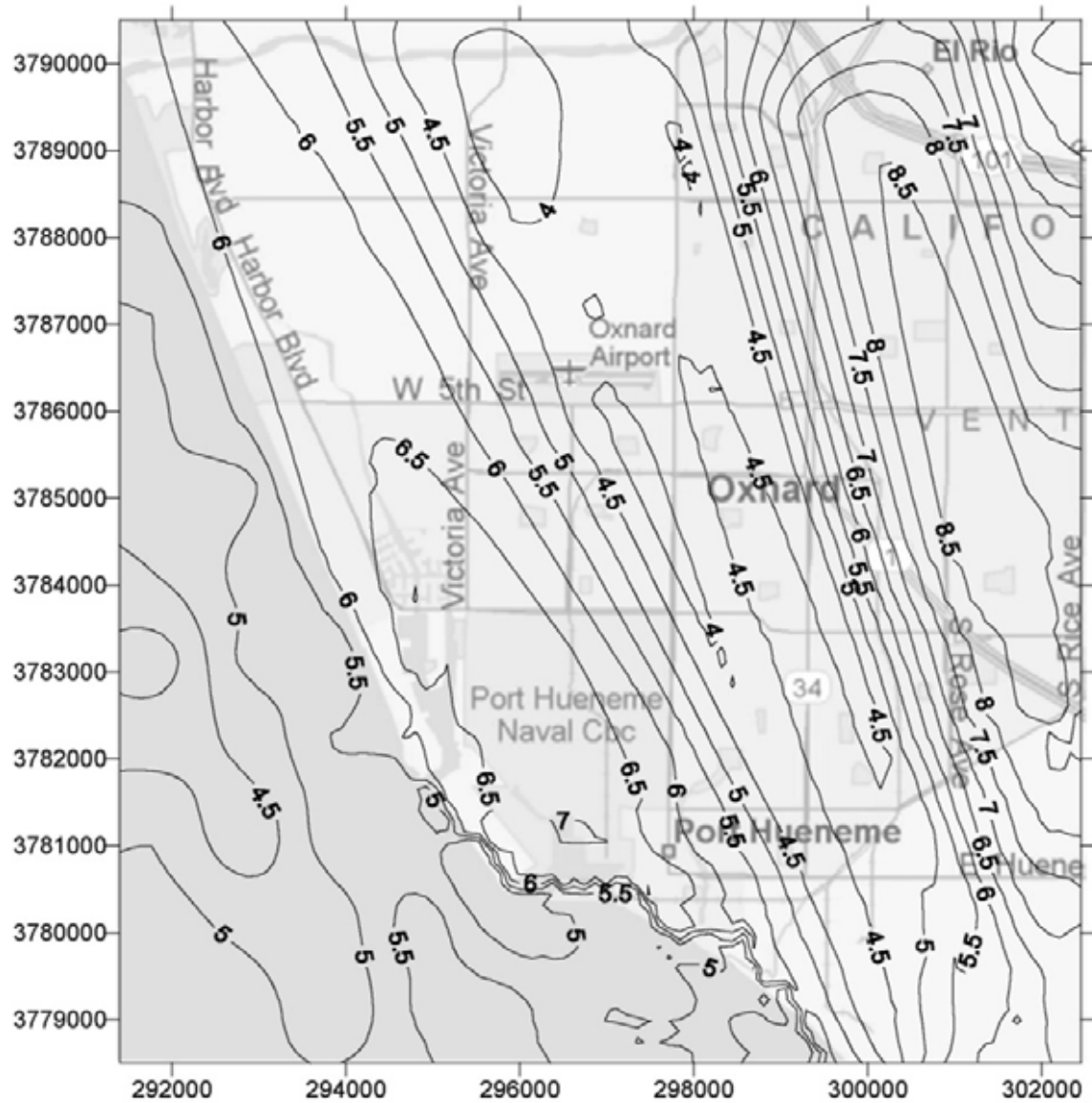
Note: Lines show contours of constant concentration; impacts are in units of µg/m³.

Figure 1-4
BHP Cabrillo LNG Deepwater Port
Annual Average PM₁₀ Impacts: FSRU Sources Only
Maximum Modeled Impacts



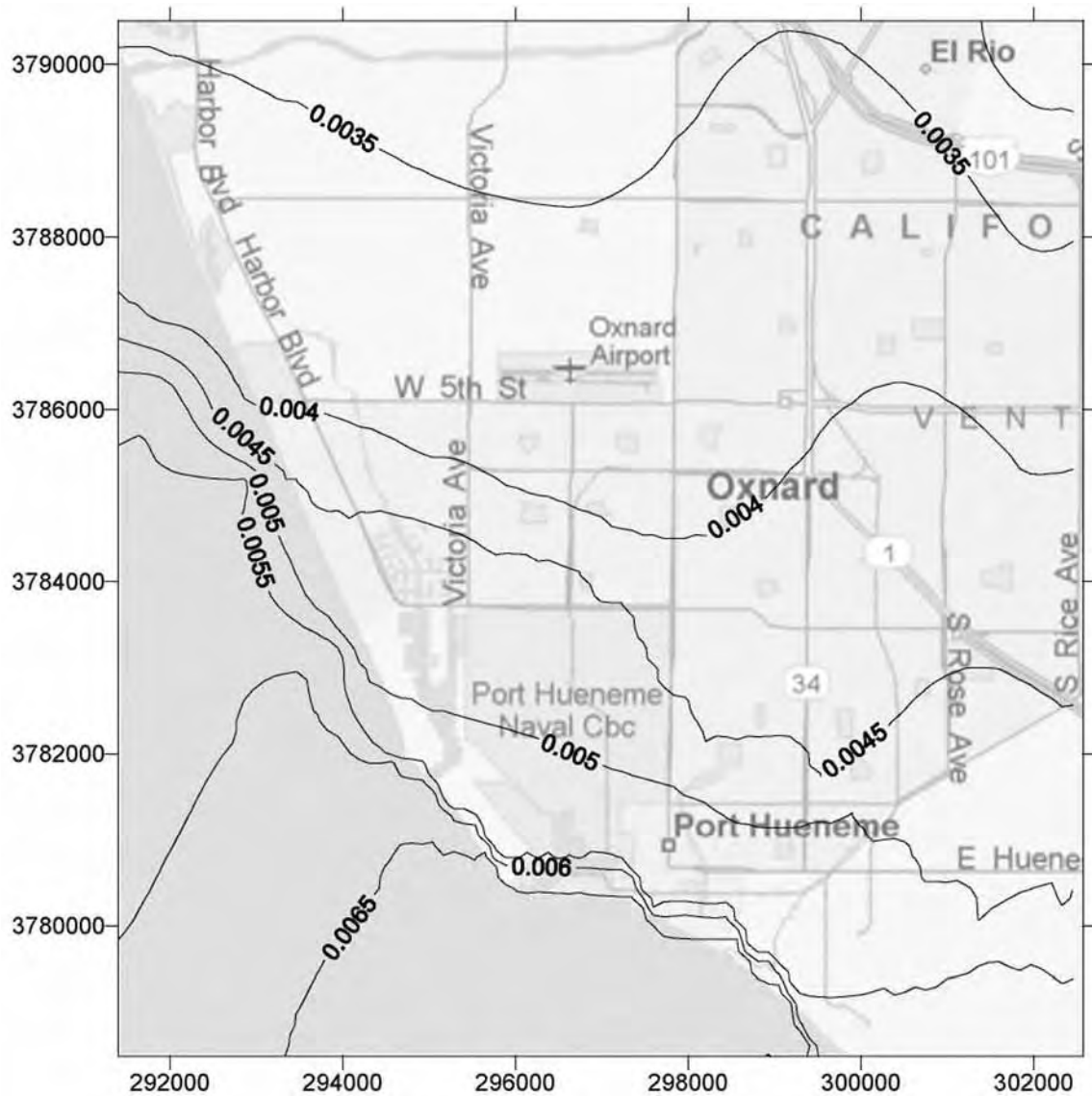
Note: Lines show contours of constant concentration; impacts are in units of $\mu\text{g}/\text{m}^3$.

Figure 1-5
BHP Cabrillo LNG Deepwater Port
One-Hour Average NO₂ Impacts: FSRU Sources Only
Maximum Modeled Impacts Over Oxnard Area



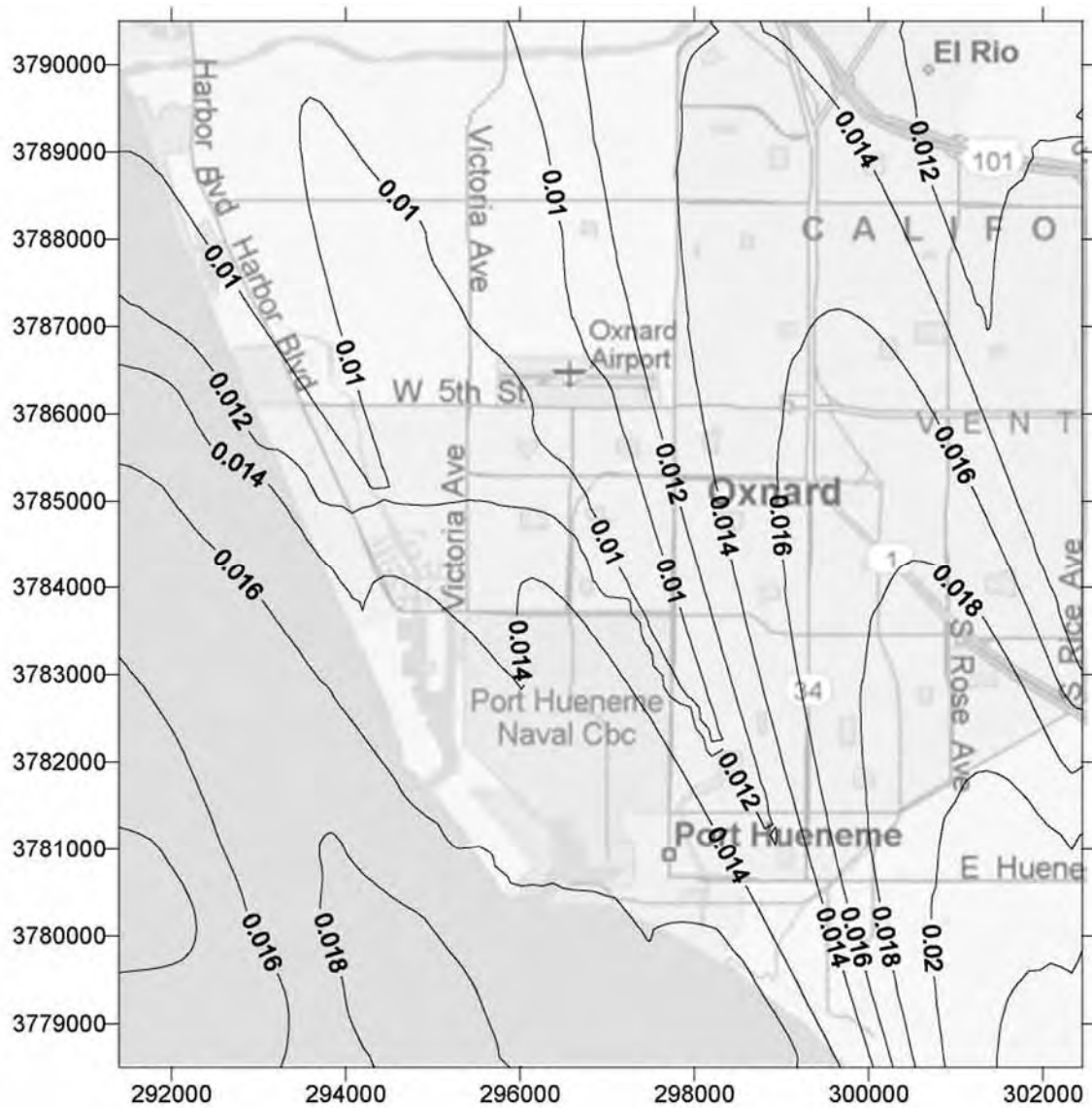
Note: Lines show contours of constant concentration; impacts are in units of $\mu\text{g}/\text{m}^3$.

Figure 1-6
BHP Cabrillo LNG Deepwater Port
Annual Average NO₂ Impacts: FSRU Sources Only
Maximum Modeled Impacts Over Oxnard Area



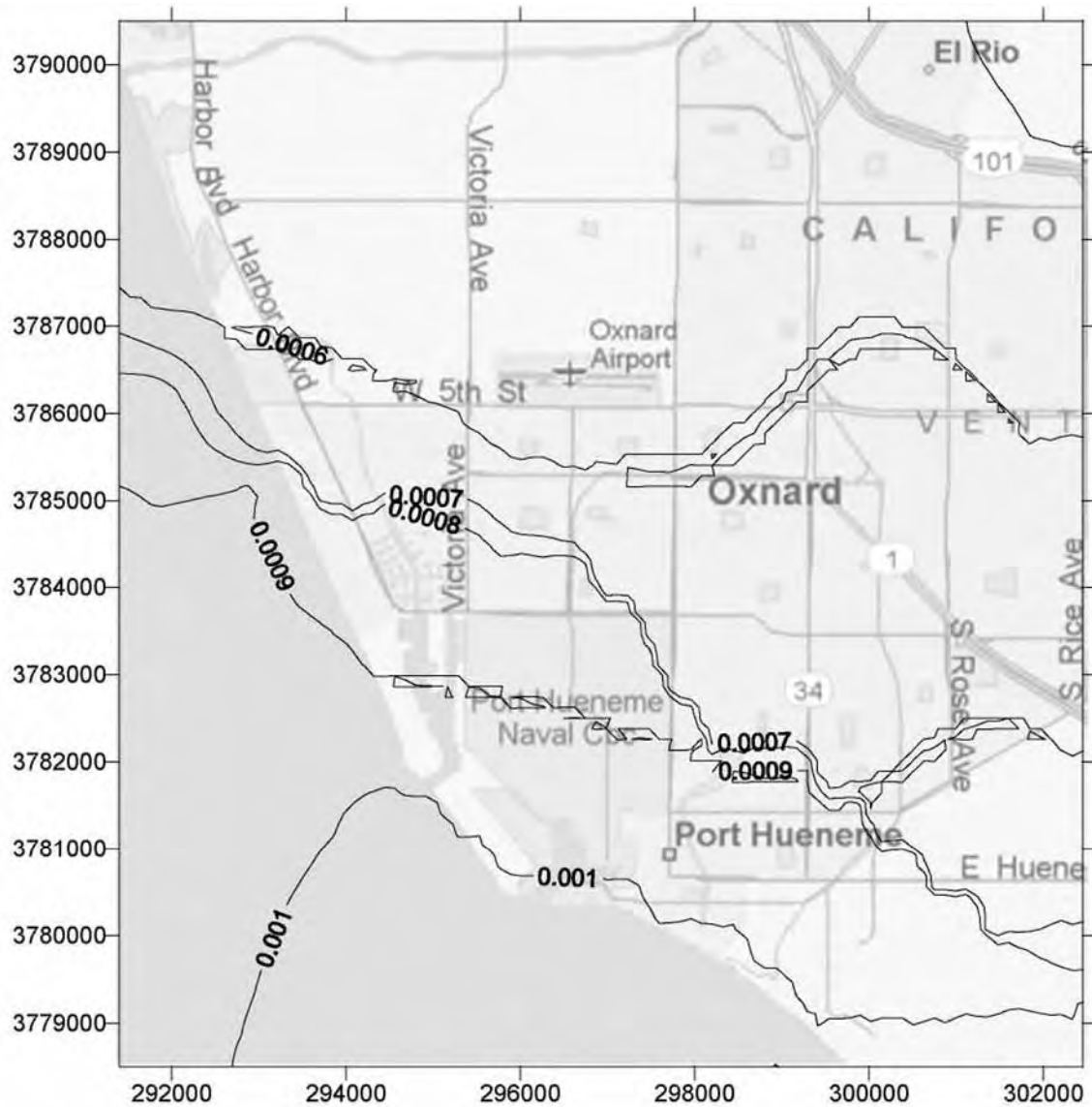
Note: Lines show contours of constant concentration; impacts are in units of µg/m³.

Figure 1-7
BHP Cabrillo LNG Deepwater Port
24-hr Average PM₁₀ Impacts: FSRU Sources Only
Modeled Impacts Over Oxnard Area



Note: Lines show contours of constant concentration; impacts are in units of $\mu\text{g}/\text{m}^3$.

Figure 1-8
BHP Cabrillo LNG Deepwater Port
Annual Average PM₁₀ Impacts: FSRU Sources Only
Maximum Modeled Impacts Over Oxnard Area



Note: Lines show contours of constant concentration; impacts are in units of µg/m³.